6.10 BIOLOGICAL RESOURCES

6.10.1 Affected Environment

This section is divided into discussions of general wildlife and vegetation and habitat types common to DMR, including sensitive species and habitats known to occur or with the potential to occur in this area. The DMR ROI was based largely on the potential for damage from fires during SBCT training. Fire has been evaluated to be the most far-reaching impact of SBCT on DMR, with the exception of Dillingham Trail because of its ability to affect a large area. Fire is a lesser concern for Dillingham Trail, where trampling/crushing, introduction of exotic species, and noise are the major concerns. The ROI at DMR has been determined, based on the above factors, to correspond with the installation boundary. The DMR ROI also includes a 164-foot (50-meter) buffer on either side of Dillingham Trail as well as a portion of the coastline and adjacent Pacific waters over which aircraft maneuvers may occur.

The waters that surround the islands in the Hawaiian chain host an array of marine wildlife (NMFS 2000a to 2000bb) and extensive coral reef ecosystems that support a variety of industries and resource uses (HCRI 2002). The location and sensitivity of these ecosystems were taken into account when determining the ROI for the SBCT project areas. Marine organisms and wildlife are evaluated when they occur adjacent to or in the vicinity of the terrestrial ROI. The DMR ROI is represented in Figure 6-14. The final SBCT ROI is still in the process of being agreed upon by the Army and USFWS. Changes to the present ROI, depicted in Figure 6-14, could alter the qualitative and quantitative analyses within the biological resources affected environment section.

Biological data were collected from numerous sources, including the USFWS, NOAA Fisheries, DLNR, HBS, HINHP, and various biological surveys and environmental documents pertinent to the species and habitats of DMR. For details on pertinent regulations see Definition and Regulatory Considerations in Appendix N.

This DEIS is being developed concurrently with Section 7 consultation with USFWS. The biological resource section will be updated as necessary to reflect any additional information or analysis resulting from these consultations. These updates will be included in the FEIS.

Recovery Plan

Four plant and two animal species with recovery plans are known to or have the potential to occur within the DMR ROI. These species are listed in Appendix I-1a.

Vegetation

The area surrounding DMR is sparsely populated, and neighboring land is either owned privately or by the State of Hawai'i. Botanical surveys to identify rare plants, communities, and potential threats to these resources have been conducted intermittently since 1977. HINHP surveyed the area in 1995, but the visit was brief due to the small size and rugged terrain of the training area. During this site visit, HINHP staff documented the only known

Figure 6-14
Dillingham Military Reservation Region of Influence

example in Hawai'i of extremely dry closed canopy forest. These natural resource surveys have been used for the resource assessments in the *Endangered Species Management Plan Report, O'ahu Training Areas* (R. M. Towill Corp. 1997b), as well as the more recent *O'ahu Training Areas Natural Resource Management Report* (PCSU 2001) and *O'ahu Training Areas INRMP* (USARHAW and 25th ID[L] 2001a). Figure 6-15 shows the locations of vegetation communities described below that occur within the DMR ROI. The four plant species with recovery plans in the ROI are identified in Appendix I-1.

The low-lying areas of DMR are populated mostly by nonnative vegetation, some species posing serious threats to the native natural communities that exist in more remote locations of this small training area. Guinea grass *(Paniucum maximum)* is becoming more widespread in DMR. It regenerates quickly after fire and can inhibit the growth of other plants by its dense matting and by producing chemicals that discourage other plants from taking root.

There are only two types of native lowland dry communities on DMR. Lonomea *(Sapindus oahuensis)* forest is the only known occurrence in Hawai'i of a closed canopy, extremely dry forest type. Little information is available about this type of forest due to its rarity. On DMR it is found on the cliff slopes at the southern end of the training area. It is considered to be globally imperiled. The other forest type is wiliwili *(Erythrina sandwicensis)*. This is also found in the sloping cliff areas of DMR but grows in patches with the Lonomea Forest. These areas are surrounded by heavily degraded weedy shrubland.

A jurisdictional wetland was identified in the DMR ROI and is described further under Biologically Significant Areas.

Disturbed Habitat

Invasive and noxious weeds targeted for eradication in DMR include padang cassia *(Cinnamomum burmannii)*, Chinese banyan *(Ficus macrocarpa)*, and fountain grass *(Pennisetum setaceum)* (USARHAW and 25th ID[L] 2001a). Widespread weed species would be controlled where they threaten native plants and communities.

Pigs are not considered a serious threat to the natural resources at DMR, though Natural Resources staff observe signs of pig activity. What native habitat remains at DMR is inaccessible to pigs.

Habitat disturbance by humans on DMR includes possible disturbance by military training activities. Trampling associated with training activities could affect populations of rare plants (R. M. Towill Corp. 1997b). Nonmilitary impacts on the area include those from hiking and occasional hunting and poaching.

Fire threat is moderate in DMR and is a threat to native plants and ecological communities. Nonmilitary fire impacts could come from vehicles, campfires, arsonists, cigarettes, and civilian use of the airfield (R. M. Towill Corp. 1997b). Civilian use might also contribute to pollution and introduction of exotic species into the area. Additionally, the rugged terrain of the training area limits access for fire suppression and control. DMR is a small parcel of land

Figure 6-15
Vegetation Communities in the Dillingham Military Reservation Region of Influence

and the training that takes place there is relatively low impact, so there are few ITAM requirements for this range. The ITAM program at DMR provides for collection of plant specimens to document species and supports Range Division through the use of GIS and GPS. A WFMP is in production for this range.

Wildlife

Zoological field surveys on DMR have been limited due to the rugged terrain and small size. Surveys have focused on special status invertebrates, mammals, and birds. No specific reptile surveys have been conducted on DMR due to the absence of native terrestrial reptiles and amphibians on the Hawaiian Islands. Surveys of DMR were made by the Environmental Impact Study Corp. in 1977, the HINHP in 1995, and PCSU natural resource staff in 2000 and 2001. The following sections describe the general presence of species within the invertebrate, mammal, bird, and fish species. There are two wildlife species with a recovery plan in the ROI (Appendix I-1).

Invertebrates

The native invertebrates on DMR could include dragonflies *(Nesogonia blackburni)* and damselflies *(Megalagnion hawaiiense)* (USARHAW and 25th ID[L] 2001a). In surveys of DMR conducted in 1995, staff from the HINHP detected three nonnative invertebrates: cannibal snail *(Euglandina rosea),* two-spotted leafhopper *(Sophonia rufofascia),* and Louisiana crayfish *(Procambarus clarki).* The black twig borer is suspected to occur on DMR, based on the presence of host species.

Humans have purposely or accidentally introduced these nonnative species to O‘ahu. They now threaten the native snail species through competition for resources and predation, as well as by the spread of disease.

Amphibians

There are no native terrestrial amphibians on the Hawaiian Islands. Nonnative amphibians with the potential to occur at DMR include the green and black dart-poison frog, bullfrog, wrinkled frog, giant toad, and Cuban tree frog (USARHAW and 25th ID[L] 2001a). These species were introduced into O‘ahu from other countries and have inhabited areas where adequate aquatic habitat and surrounding vegetation exists.

Reptiles

The Hawaiian Islands have no native terrestrial reptiles. Nonnative reptiles with the potential to occur at DMR include the green anole, mourning gecko, stump-toed gecko, tree gecko, Indo-Pacific gecko, house gecko, metallic skink, and gold dust day gecko (USARHAW and 25th ID [L] 2001a).

Terrestrial Mammals

The Hawaiian hoary bat has the potential to occur on DMR (PCSU 2001). It is the only native terrestrial mammal on the Hawaiian Islands. The following nonnative species may occur on DMR: feral pig, feral cat, feral dog, Norway rat, black rat, Polynesian rat, and house mouse.

Birds

The following indigenous forest bird species have been recorded on DMR: Hawaiian duck *(Anas wyvilliana),* Hawaiian coot *(Fulica alai),* Hawaiian goose *(Branta sandwicensis),* and Hawaiian moorhen *(Gallinula chloropus sandvicensis).* The pueo *(Asio flammeus sandwichensis)* is believed to occur on DMR, based on the presence of adequate habitat and prey.

Nonnative bird species believed to occur in DMR include the red-billed leiothrix, white-rumped shama, Japanese bush warbler, rock dove, spotted dove, zebra dove, common myna, red-vented bulbul, and Japanese white-eye. The nutmeg manikin, red-crested cardinal, barn owl, Erchel's francolin, ring-necked pheasant, and northern cardinal are also species that have been introduced by humans on O'ahu. This list of nonnative species is based on those species present on the nearby Mālwa Military Reservation which has areas of corresponding habitat (R. M. Towill Corp. 1997b).

Fish

There are no documented studies of fish in DMR streams (USARHAW and 25th ID[L] 2001a).

Marine Biological Resources

A portion of the DMR ROI is located along the north shore of the northwestern tip of O'ahu. DMR is adjacent to a small segment of beachfront that runs along the coast. The ROI is extended to include this portion of the coast and adjacent Pacific waters to address potential impacts on marine biological resources. This area is outside the Hawaiian Islands Humpback Whale National Marine Sanctuary waters.

There are no coral reef "hot spots" in the DMR ROI, that is, no specific coral reef areas of management concern (CRAMP 2003). There are, however, coral reefs in the coastal waters of the DMR ROI within a half a mile of the shoreline.

Marine wildlife does occur in the DMR ROI. In general, the north shores of the Hawaiian Islands have slightly different distributions of marine mammals and sea turtles than the leeward sides of the islands. The north shores tend to be more affected by the trade winds and larger swells, and therefore have rougher and more turbulent seas. The deeper diving species may tend to be sighted more frequently off the north shores of the islands than the leeward sides of the islands. Additionally, the adjacent coastline area of DMR may provide shore habitat for some marine wildlife, such as sea turtles or monk seals.

Distribution and abundance of marine mammals and sea turtles in Pacific waters vary seasonally and spatially; that is, the numbers and types of animals may vary in the nearshore versus the offshore regions, as well as by the time of year (Calambokidis et al. 1997; Leatherwood et al. 1982; Mobley et al. 1999, 2000; NMFS 2000a to 2000bb). All marine mammal species are protected under the MMPA, regardless of their status under the ESA. Informal consultation with NOAA Fisheries has been initiated for marine mammals in the DMR ROI. Both MMPA and ESA protected marine wildlife species that may occur in the DMR ROI seasonally, permanently, or as transients, are listed in Table 6-18.

Whales and Dolphins in Hawaiian Waters of the Dillingham Military Reservation Region of Influence

Non-ESA listed but MMPA protected marine mammals found in Hawaiian waters of the DMR ROI include the following:

- Bryde's whales (*Balaenoptera edeni);*
- Minke whales (*B. acutorostrata*);
- Pygmy sperm whales (*Kogia breviceps*);
- Dwarf sperm whales (*K. simus*);
- Killer whales (*Orcinus orcina*);
- False killer whales (*Pseudorca crassidens*);
- Pygmy killer whales (*Feresa attenuate*);
- Pilot whales (*Globicephala macrorhynchus*);
- Beaked whale species (*Mesoplodon* and *Ziphius* spp.);
- Baird's beaked whale (*Berardius bairdii*);
- Melon-headed whales (*Peponocephala electra*);
- Bottlenose dolphins (*Tursiops truncatus*);
- Spinner dolphins (*Stenella longirostris*);
- Rough-toothed dolphins (*Steno bredanenis*);
- Risso's dolphin (*Grampus griseus*);
- Striped dolphin (*Stenella coeruleoalba*);
- Common dolphin (*Delphinus delphis*); and
- Several species of spotted dolphins, the most common of which is *Stenella attenuata.*

The natural history of these species, as well as specific documented locations either in or near the DMR ROI (if known), are described in Appendix I-1. (Note: As marine mammals are mobile and rapid movers, if they have been documented near the DMR ROI [within 2 to 5 nautical miles], they are assumed to occur in the ROI.)

Sensitive Species

Sensitive species include special status, or regulated, species such as USFWS or State of Hawai'i listed endangered, threatened, candidate, or proposed species; MMPA species; federal and state species of special concern; and locally regulated species. Also considered sensitive are rare species that have had rapid population decline or whose habitat has markedly decreased in recent years. Potential sensitive species on DMR were identified by the State of Hawai'i DLNR (HDLNR 2002a), USARHAW biologists and surveys, and TNC's Hawaiian Heritage Program (HINHP 1994).

Table 6-18
Sensitive Marine Wildlife Occurring or Potentially Occurring in Hawaiian Waters near Dillingham Military Reservation Region of Influence

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
Cetaceans and Pinnipeds							
Balaenoptera acutorostrata	Minke whale	*	-	May occur in nearshore or offshore waters	Known Currently	P	Most common northwest of the main seven-island chain or on leeward side of islands. May be incidentally sighted in waters adjacent to DMR.
B. Borealis	Sei Whale	E*	-	Most likely in deeper offshore waters	Known currently	U	Rarely sighted in Hawaiian waters.
B. edeni	Bryde's whale	*	-	May occur in nearshore or offshore waters	Known Currently	P	Most common northwest of the main seven-island chain. May be incidentally sighted in waters adjacent to DMR.
B. musculus	Blue whale	E*	-	Most likely in deeper offshore waters	Known currently	U	Heard in Hawaiian waters.
B. physalus	Fin whale	E*	-	Most likely in deeper offshore waters	Known currently	U	Heard but rarely sighted in Hawaiian waters.
Berardius bairdii	Baird's beaked whale	*	-	Most likely in deeper offshore waters	Known Currently	P	May be incidentally sighted in waters adjacent to DMR.
Delphinus Delphis	Common dolphin	*	-	Most likely in deeper offshore waters	Known Currently	U	May be incidentally sighted in waters adjacent to DMR.
Eubalaena glacialis	Pacific right whale	E*	-	Unknown if depth is a criteria	Known currently	U	Most likely stray individuals from more northern population.
Feresa attenuate	Pygmy killer whales	*	-	May occur in nearshore or offshore waters	Known Currently	C	Occasionally seen in the channels between the main islands. Has been documented off the coast of O'ahu.
Globicephala macrorhynchus	Short-finned pilot whale	*	-	May occur in nearshore or offshore waters	Known Currently	C	Occasionally seen in the channels between the main islands. Common in nearshore or offshore areas in waters adjacent to DMR.
Grampus griseus	Risso's dolphin	*	-	Most likely in deeper offshore waters	Known Currently	U	More common sighted offshore. May be seen in offshore areas in waters adjacent to DMR
Kogia breviceps	Pygmy sperm whale	*	-	Most likely in deeper offshore waters	Known Currently	P	Prefers deeper waters but occasionally seen in the channels between the main islands. May be incidentally sighted in waters adjacent to DMR.
K. simus	Dwarf sperm whale	*	-	Most likely in deeper offshore waters	Known Currently	P	Prefers deeper waters but occasionally seen in the channels between the main islands. May be incidentally sighted in waters adjacent to DMR.

Table 6-18
Sensitive Marine Wildlife Occurring or Potentially Occurring in Hawaiian Waters near Dillingham Military Reservation Region of Influence *(continued)*

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
Monachus schauinslandi	Monk seal	E*, CH, D	-	More common in nearshore waters or hauled out on the coast.	Known currently	C	Most common northwest of the main seven-island chain. Incidental individuals may haul out along the coast of the islands' north shores. Anecdotal sighting on DMR beach.
Megaptera novaeangliae	Humpback whale	E*	-	May occur in nearshore or offshore waters	Known currently	C	Occurs throughout the main seven-island chain January through April. Occurs in waters adjacent to the islands' north shores.
Mesoplodon densirostris	Blainsville's whale	*	-	Most likely in deeper offshore waters	Known Currently	C**	Prefers deeper offshore waters but has been sighted off coast of O'ahu.
Orcinus orca	Killer whale	*	-	May occur in nearshore or offshore waters	Known Currently	C**	Occasionally seen, especially in the channels between the main islands and at the northwest island chain. May be incidentally sighted in nearshore or offshore waters adjacent to DMR.
Peponocephala electra	Melon-headed whale	*	-	May occur in nearshore or offshore waters	Known Currently	C**	Occurs especially in the channels between the main islands and at the northwest island chain. May also occur in nearshore or offshore areas adjacent to DMR.
Physeter macrocephalus	Sperm whale	E*	-	Most likely in deeper offshore waters	Known currently	P	Most common off the north and eastern shores of the main seven islands. May be sighted in waters adjacent to the islands' north shores.
Pseudorca crassidens	False killer whale	*	-	May occur in nearshore or offshore waters	Known Currently	C**	Occasionally seen in the channels between the main islands. May be sighted in nearshore or offshore waters adjacent to DMR.
Stennella attenuata	Spotted dolphin	*	-	Most likely in nearshore, leeward coastal waters	Known Currently	C	Common along the coastline, especially on the leeward sides of the island. Occurs in nearshore or offshore areas in waters adjacent to DMR.
S. coeruleoalba	Striped dolphin	*	-	May occur in nearshore or offshore waters	Known Currently	P	More strandings sighted than live individuals.
S. longirostris	Spinner dolphin	*	-	Most likely in nearshore, leeward coastal waters	Known Currently	C	Common along the coastline. Occurs in nearshore or offshore areas in waters adjacent to DMR.
Steno bredanensis	Rough toothed dolphin	*	-	Most likely in deeper offshore waters	Known Currently	C**	Prefers deeper offshore waters but has been sighted off coast of O'ahu.

Table 6-18
Sensitive Marine Wildlife Occurring or Potentially Occurring in Hawaiian Waters near Dillingham Military Reservation Region of Influence *(continued)*

Scientific Name	Common Name	[1]Federal Status	[2]State Status	Habitat	Date Last Observed	Likelihood of Occurrence	Notes
Tursiops truncatus	Bottlenose dolphin	*	-	May occur in nearshore or offshore waters	Known Currently	C	Common along the coastline. Occurs in nearshore or offshore areas in waters adjacent to DMR. Also common offshore in project area waters.
Ziphius cavirostris	Cuvier's beaked whale	*	-	Most likely in deeper offshore waters	Known Currently	C**	Most common of the beaked whales in project area waters. Prefers deeper offshore waters but can be common in nearshore or offshore areas in waters adjacent to DMR.
Sea Turtles							
Caretta caretta	Loggerhead turtle	T	-	In project area; prefers nearshore waters	Known currently	U	Considered uncommon in DMR waters.
Chelonia mydas	Green turtle	T	-	In project area; prefers nearshore waters	Known currently	C	Nests annually on Hawaiian beaches; common in nearshore areas of any of the main seven islands. Most abundant sea turtle in DMR waters.
Dermochelys coriacea	Leatherback turtle	E	-	In project area; prefers offshore waters	Known currently	C	Primarily occurs over deep oceanic waters; sighted equally as frequently off any of the main seven islands.
Eretmochelys imbricata	Hawksbill turtle	E	-	In project area; prefers nearshore waters	Known currently	U	Considered uncommon; a small number nest on the island of Hawai'i.
Lepidochelys olivacea	Olive ridley turtle	T	-	In project area; prefers offshore waters	Known currently	U	Infrequently seen in Hawaiian offshore waters.

Sources: NMFS 2000a-bb; ONR 2000.

Status:
[1]Federal:
E = Endangered
* = Protected under MMPA
D = Depleted under the MMPA
CH = Critical habitat designated or proposed for designation
** = presence confirmed from aerial surveys but found at a distance offshore from the DMR coastline, so discussed in Appendix rather than text.

[2]State
/-/ = No Status

Likelihood of occurrence in the project site
C = Confirmed
P = Potentially may occur
U = Unlikely to occur

A list of all sensitive vegetation and wildlife and any critical habitat found in the region, according to USFWS and DLNR records, is found in Tables 6-19 and 6-20. An assessment of the likelihood of a species occurring on DMR was made, where possible, based on the habitat requirements and geographic distribution of the species, on-site habitat quality, and the results of biological surveys of DMR. Natural history descriptions of sensitive species with the potential to occur in the ROI, and specific locations if known, can be found in Appendix I-1 (Recovery Plans 1-1a; Plants I-1b; Wildlife I-1c; Critical Habitat I-1d).

Sensitive Plant Species

The rare plants found on DMR outside of the ROI include federal species of concern, candidates for federal listing, and state-ranked rare plants. *Bobea sandwicensis, Hibiscus brackenridgei* ssp. *Mokuleianus, H. kokio* spp. *kokio,* and *Schiedea kealiae* are all sensitive species with the potential to occur within the ROI. The remaining native ecosystems near or adjacent to the ROI have low densities of native species and are fragmented and disturbed. A 1977 survey found unique populations of Lonomea and *Reynoldsia sandwicensis* near the base of the cliffs. Though not endangered, these species are rare and represent the only example of closed canopy *Sapindus oahuensis* forest known in the world.

Sensitive plants and their likelihood of occurrence in DMR ROI are shown in Table 6-19.

Sensitive Wildlife Species

The following discussion includes a profile of sensitive wildlife species considered likely to be found in the project area. This information is primarily based on information from the O'ahu INRMP (USARHAW and 25th ID[L] 2001a), the ESMPR (R. M. Towill Corp 1997b), and the Biological Inventory of DMR (HINHP 1994). The first extensive zoological surveys of DMR were conducted in 1976 and 1977 (Shallenberger and Vaughn 1978). More recent studies were conducted in 1995 by HINHP, in search of rare and sensitive species on DMR, and by PCSU natural resource staff in 2000 and 2001. The latest USFWS and HINHP survey information on species and habitat in the SBCT ROI has been incorporated into this evaluation of biological resources. Table 6-20 lists sensitive terrestrial wildlife and their potential to occur in the DMR ROI. Figure 6-16 shows the documented locations of sensitive terrestrial wildlife recorded in the DMR ROI.

Marine Wildlife

Six species of endangered whales occur in the Pacific tropical waters of Hawai'i and could potentially be found in the waters adjacent to DMR (in the DMR ROI). Five of these are baleen whales including the humpback *(Megaptera novaeangliae),* fin *(Balaenoptera physalus),* blue *(Balaenoptera musculus),* sei *(Balaenoptera borealis),* and pacific right *(Eubalaena glacialis);* and there is one toothed whale, the sperm whale *(Physeter macrocephalus).* There is one federally listed endangered seal, the monk seal *(Monachus schauinslandi).* The monk seal has critical habitat in the northwestern portion of the Hawaiian Island chain, which is outside of the ROI. There are five listed sea turtles that could occur in the Pacific tropical waters of Hawai'i, two of which are common in Hawai'i, the green sea turtle *(Chelonia mydas),* which is federally threatened, and the leatherback sea turtle *(Dermochelys coriacea),* which is federally endangered. The green sea turtle is expected to occur in the ROI, but the leatherback turtle most likely would not occur because it prefers offshore waters.

Table 6-19
Sensitive Plant Species Occurring or Potentially Occurring at DMR ROI

Scientific Name	Hawaiian Name/Common Name	Federal[1] Status	State[2]/Global[3] Status	Habitat	Date Last Observed	Likelihood of Occurrence
Bobea sandwicensis	ʻahakea/-	-	-/G2	Ridges and gulch slopes of dry to moist lowland forests	Unknown	P
Cyperus trachysanthos	puʻukaʻa/-	E, CH	-/G1	Wet slopes and pond margins in lowland areas	Unknown	P
Hibiscus brackenridgei ssp. *mokuleianus*	Kokiʻo keʻokeʻo, maʻo hau helemaʻo hau hele, maʻo hau helemaʻo hau hele/-	E, CH	-/G1	Lowland dry forests	Unknown	P
H. kokio spp. *kokio*	kokiʻo ʻulaʻula/-	SOC	-/ G2	Wet or dry forests adjacent to DMR	2000	C
Lepidium bidentatum var. *o-waihiense*	ʻānaunau, naunau, kūnānā/-	SOC	-/-	Steep dry coastal slopes in low elevations	Unknown	P
Lipochaeta remyi	nehe/-	SOC	-/G1	Wet sites in dry forests	Unknown	P
Nototrichium humile	kuluʻī/-	E, CH	-/G2	Dry forest understory and cliff faces	Unknown	P
Schiedea kealiae	NCN	E, CH	-/G1	Dry cliff faces and steep slopes	2000	C

Sources: USFWS 2002a; USARHAW and 25th ID [L] 2001a; PCSU 2000

Notes:

NCN = No Common Name

Status:

[1]Federal:
E = Endangered
SOC = Species of concern
CH = Critical habitat designated or proposed for designation

[3]Heritage Global Rank:
G1 = Species critically imperiled globally (typically 1-5 current occurrences)
G2 = Species imperiled globally (typically 6-10 current occurrences)

[2]State
/-/ = No Status

Likelihood of occurrence on the project site
C = Confirmed
P = Potentially may occur

Table 6-20
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at Dillingham Military Reservation Region of Influence

Scientific Name	Hawaiian Name/ Common Name	Federal[1] Status	State[2]/Global[3] Status	Habitat	Date last observed	Likelihood of Occurrence
Invertebrates						
Megalagrion xanthomelas	-/orange-black damselfly	C	-/G2	Breeds in coastal wetlands, perennial streams, reservoirs, ponds.	2000	U*
Birds						
Anas wyvilliana	koloa maoli/Hawaiian duck	E	E/G1	Lowland marshes, reservoirs, taro patches, pastures, drainage ditches, agricultural lands below 1,000 feet (305 meters), stream and river valleys in densely wooded areas at higher elevations, mountain pools, mountain bogs, forest swamps, natural and human-made ponds, wetlands. Nests on ground near water in well-concealed site, primarily on small islets.	1995	C^
Asio flammeus sandwichensis	pueo/Hawaiian short-eared owl	SOC, +	E**/G5T3	Pastures, grasslands, dry and wet forests that are dominated by either native or nonnative vegetation, sea level to 7,900 feet (2,408 meters).	Unknown	P
Chasiempis sandwichensis ibidis	Oʻahu ʻelepaio/-	E, CH	E/G4T1	Native Hawaiian forest.	Unknown	P
Fulica alai	ʻalae keʻokeʻo/Hawaiian coot	E	E/G2	Herbaceous wetland, lagoon, river mouth/tidal river, low gradient, pool, shallow water, herbaceous wetland.	1995	C^
Gallinula chloropus sandvicensis	ʻalaeʻula/Hawaiian common moorhen	E	-/-	Freshwater marshes, taro patches, reedy margins of water courses, reservoirs, wet pastures.	Unknown	C^
Himantopus mexicanus knudseni	aeʻo/black-necked stilt	E	-/G5T2	Shallow salt or freshwater with soft muddy bottom; grassy marshes, wet savanna, mudflats, shallow ponds, flooded fields, borders of salt ponds and mangrove swamps. Nests along shallow water of ponds, lakes, swamps, or lagoons. May nest on the ground or in shallow water on a plant tussock.	Unknown	C^
Paroreomyza maculata	ʻalauahio/Oʻahu creeper	E	E/G1	Native Hawaiian shrublands, forests, bogs.	Unknown	U
Vestiaria coccinea	ʻiʻiwi/Hawaiian honeycreeper	+	E/G4	Native forests, especially ʻōhiʻa *(Metrosideros)* forest.	Unknown	U

Table 6-20
Sensitive Terrestrial Wildlife Species Occurring or Potentially Occurring at Dillingham Military Reservation Region of Influence *(continued)*

Scientific Name	Hawaiian Name/ Common Name	Federal[1] Status	State[2]/Global[3] Status	Habitat	Date last observed	Likelihood of Occurrence
					Unknown	
Mammals						
Lasiurus cinereus semotus	-/Hawaiian hoary bat	E	E/G5T2	Bare rock, cliff, hardwood forest, grassland/herbaceous, hardwood woodland, riparian habitats.	Unknown	P

Sources: USARHAW and 25th ID(L) 2001a; HDLNR 2002a; HINHP 1994; R. M. Towill Corp. 1997b; NatureServe 2001; Virginia Tech 1998; PCSU 2001
Notes::
NCN = No Common Name
*The species record is based on an attempted reintroduction, which subsequently failed. This species has not been identified in this location since.
**The state endangered listing refers only to the populations on O'ahu, Lana'i, and Moloka'i.

^These four waterbirds have been documented at DMR, however, there have been extensive surveys for them and it has been determined that they are not resident species.

[1]Status:

[1]Federal:
E = Endangered
SOC = Species of concern
C = Candidate
/-/ = No Status
+ = Birds of Conservation Concern

[3]Heritage Global Rank:
G1 = Species critically imperiled globally (typically 1-5 current occurrences.
G2 = Species imperiled globally (typically 6-10 current occurrences).
G4 = Species apparently globally secure.
G5 = Species demonstrably globally secure.
T1 = Subspecies critically imperiled globally (typically 1-5 current occurrences).
T2 = Subspecies imperiled globally (typically 6-10 occurrences).
T3 = Subspecies either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range, or because of other factors making it vulnerable to extinction throughout its range (21-100 occurrences).

[2]State
E= Endangered
/-/ = No Status

Likelihood of occurrence on the project site
C = Confirmed
P = Potentially may occur
U = Unlikely to occur

Figure 6-16
Special Status Wildlife Species in the Dillingham Military Reservation Region of Influence

Of these marine mammals, the only likely occurrence in the ROI would be the humpback whale, the monk seal, and the green sea turtle. Table 6-18 lists the likelihood of occurrence of these species within the project area and associated habitat and regulatory information. The natural history of these species, as well as specific documented locations either in or near the DMR ROI (if known), are described in Appendix I-1. (Note: As marine mammals are mobile and rapid movers, if they have been documented near the DMR ROI [within 2 to 5 nautical miles], they are assumed to occur in the ROI.)

Sensitive Habitats

Critical Habitat

Forty-four acres of plant critical habitat is proposed within the DMR ROI. The listed plants known or with the potential to occur within the ROI, and for which critical habitat is proposed, are listed in Appendix I-1d. Proposed plant critical habitat occurring within the ROI is shown in Figure 6-17. There is no federally designated or proposed critical habitat for wildlife within the DMR ROI.

Biologically Significant Areas

Classifications of BSAs are defined in Section 5.10-1.

- BSA1: On DMR, Lonomea lowland dry forest is classified as a BSA1 rare natural community, with Global Heritage Ranking G2.
- BSA2: There is one BSA2 area on DMR, adjacent to the BSA1 area and in the southern portion of DMR in an area of sloping cliffs.
- BSA3: There are no BSA3 areas in DMR.

A wetland delineation of DMR was conducted in the spring and summer of 2002 following the ACOE 1987 wetland delineation manual; results were published in a report dated August 2002 (USACE 2002d). The survey identified one USACE potential jurisdictional wetland on DMR (USACE 2002d). The wetland is spring fed, is dominated by primrose willow, is approximately 240 square meters (USACE 2002d), and is identified along with the BSAs in Figure 6-18.

6.10.2 Environmental Consequences

This section identifies potential biological impacts that may result from the Proposed Action, Reduced Land Acquisition, and No Action. The methodology and significance criteria used to determine the level of impact on biological resources are described in Section 4.10.1.

The Army and USFWS have not yet agreed on a final ROI. Changes to the present ROI, depicted in Figure 6-14, could alter the qualitative and quantitative analyses within this environmental consequences section.

Figure 6-17
Proposed Plant Critical Habitat in the Dillingham Military Reservation Region of Influence

Figure 6-18
Dillingham Military Reservation National Wetland Inventory and Biologically Sensitive Area

Summary of Impacts

Impacts on biological resources would occur as a result of construction, the elevated use of areas by soldiers and the intensification of training including off-road mounted maneuvers, and the increase in nonlive-fire training. All biological resources have been assessed for potential impacts from project activities. For a full description of the impact methodology used to determine impact to a resource please refer to chapter 4.10. Only the resources potentially affected are included in this chapter. If a resource was determined not to be impacted, it has not been included for discussion. A summary of impacts is provided in Table 6-21.

Significant impacts mitigable to less than significant are fire effects on sensitive species and habitat resulting from construction and training; impacts on federally listed species and habitat from fire; impacts on sensitive species and habitat from the spread of nonnative species; and loss and degradation of sensitive species and habitat from training and construction at DMR and along Dillingham Trail. Less than significant impacts involve threats to migratory birds from FTI construction, noise and visual impacts on wildlife, and impacts on general vegetation and wildlife from construction and training.

Proposed Action (Preferred Alternative)

Significant but Mitigable to Less than Significant Impacts

Impact 1: Impacts from fires on sensitive species and habitat. Although no live-fire exercises are proposed at DMR, human-induced fires could occur as a result of the Proposed Action. Sources of fire include engines and cigarettes. Fires are a great threat to the natural communities in Hawai'i and could cause major impacts on biological resources, as discussed extensively in Section 5.10.2 of this report. Construction, training, and use of the Dillingham Trail would increase the threat of wildfire in the Wai'anae Mountains. The rugged terrain can limit the suppression and control of fires, which are likely to spread unchecked into areas that contain sensitive species.

Vegetation communities that could be affected by the spread of fire include those within the DMR ROI, such as those that follow:

- Nonnative vegetation (approximately 6,847 acres [2,771 hectares]);
- Lowland dry forest and shrubland (approximately 29 acres [12 hectares]);
- Coastal dry shrubland and grassland (approximately 56 acres [23 hectares]); and
- Lowland mesic forest and shrubland (approximately 194 acres [79 hectares]).

Impacts of fire on vegetation communities are discussed in Section 5.10.2 and could include the following:

- Removal of aboveground biomass;
- Soil erosion;

Table 6-21
Summary of Potential Biological Impacts at DMR

Impact Issues	Proposed Action	Reduced Land Acquisition	No Action
Impacts from fire on sensitive species and habitat.	⊘	⊘	⊘
Impacts on federally listed species and their federally designated or proposed critical habitat	⊘	⊘	⊘
Impact on sensitive species resulting from the spread of nonnative species.	⊘	⊘	⊘
Loss and degradation of sensitive species and habitat.	⊘	⊘	⊘
TSV vessel impacts on marine wildlife and habitat.	N/A	N/A	N/A
Threat to migratory birds.	⊙	⊙	⊙
Noise and visual impacts.	⊙	⊙	⊙
Impacts on general vegetation and wildlife.	⊙	⊙	⊙
Runoff impacts on marine wildlife and coral ecosystems.	○	○	○

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

LEGEND:

⊗ = Significant
⊘ = Significant but mitigable to less than significant
⊙ = Less than significant
○ = No impact
\+ = Beneficial impact
N/A = Not applicable

- Changes in community composition resulting from changes in soil texture and composition, moisture, light availability, and nutrient availability; and
- Invasion of alien species.

Federally listed and sensitive species are known to occur or have the potential to occur in the southern portion of the DMR ROI, on the northern edge of the Wai'anae Mountains (Tables 6-19 and 6-20). These species could be adversely affected by the spread of fire into their habitats. Approximately 14 acres (6 hectares) of BSAs also occur within the DMR ROI and could be affected in the event that a wildland fire occurred at DMR.

The Proposed Action would not directly affect threatened or endangered species, but, due to the risk of fire ignition associated with military activities, the disturbance or destruction of federally listed species resulting from a wildland fire is considered a potentially significant and mitigable impact.

To help prevent the ignition and spread of fire, the Army would follow guidelines in the forthcoming *Wildland Fire Management Plan, Pōhakuloa and O'ahu Training Areas*. This includes the construction of firebreak roads at DMR and would help prevent the spread of training-induced fires.

Regulatory and Administrative Mitigation 1. The mitigation measures listed below would decrease the impacts of fire on sensitive species from construction and the increased use of the DMR military vehicle trail to less than significant levels. This mitigation should be closely coordinated with the other measures to protect sensitive species and habitat. USARHAW would adhere to the following:

- Implementation of the WFMP, which, upon its completion in August 2003, will detail fire avoidance systems and response strategy. General fire protection measures are described in the wildfire section within Section 6.12.2, Hazards.
- The ecosystem management directives and Army stewardship actions described in Section 2.2.4 would avoid and minimize fire impacts on sensitive species by protecting and restoring sensitive species and habitat.
- USARHAW is considering implementing an environmental management system to further improve the identification and reduction of environmental risks inherent in mission activities. This would include ecosystem level management for all rare species, pest management, land rehabilitation and maintenance, and fire prevention and suppression.
- Section 7 consultation and other measures identified in Regulatory and Administrative Mitigations 2, 3, and 4 would apply to this impact and would help reduce the impact to a less than significant level.
- USARHAW would notify the USFWS if a fire were to escape the firebreak roads within the ROI and would consult, as necessary.

Additional Mitigation 1. Potential mitigation measures for this impact include:

- Providing resources to help adjacent private landowners and organizations manage their properties to minimize potential impacts of fire or other threats that may result from USARHAW activities or that may originate on private property and affect USARHAW activities; and
- Replanting any fire-damaged area with plants similar to those destroyed by fire. Native species would be used in areas where their establishment seems likely. Plants known to be invasive or noxious would not be used.

Additional Mitigations 3, and 4 would apply to this impact and would help reduce the impact to a less than significant level.

Impact 2: Impacts on federally listed species and their federally designated or proposed critical habitat. The Proposed Action would have a significant but mitigable impact on federally listed species and their proposed critical habitat.

The effects of fire, as described in Impact 1, would have the most significant impacts on listed species and their critical habitat. Federally listed and sensitive species are known to occur or have the potential to occur in the southern portion of the DMR ROI (Figures 6-16). This includes the Hawaiian common moorhen, Hawaiian duck, Hawaiian coot, the black-necked stilt, the Hawaiian hoary bat, *Hibiscus brackenridgei* ssp. *mokuleianus, Schiedea kealiae,* and *Nototrichium humile*. These species would be adversely affected by the spread of fire into their habitats. There is also proposed plant critical habitat within this southern portion of DMR (Figure 6-17) and which would be negatively affected by a training-induced wildfire that spread to that portion of the ROI.

Regulatory and Administrative Mitigation 2. The effects of SBCT actions on listed species in the ROIs are being evaluated as part of Section 7 consultation with USFWS. The USARHAW would consult about the proposed plant-critical habitat when it receives its federal designation. USARHAW would carry out all reasonable and prudent measures determined during this consultation, which would help avoid effects and compensate for impacts on listed species that would result directly and indirectly from implementing the Proposed Action.

Additional Mitigation 2. No additional mitigations have been proposed.

Impact 3: Impact on sensitive species resulting from the spread of nonnative species. The construction of Dillingham Trail and its use would introduce more invasive species to the area, which would have both short-term and long-term impacts on sensitive plants and wildlife.

Trail construction would increase the number of people in the area, which would increase the introduction and spread of nonnative species, particularly plant species whose seeds can be easily carried by humans on their shoes, clothing, equipment, and vehicles. Activities associated with Dillingham Trail and activities along this trail could facilitate the spread of alien species into the native wiliwili forest and the adjacent rare Lonomea forest. The Lonomea forest supports sensitive species *Schiedea kealiae* (a federally listed plant), ʻahakea, and kokiʻo.

Invasive plants have an advantage in a stressed environment and can often out-compete native species, which are not adapted to an environment created through human activity. Nonnative species that can survive in a foreign habitat often have evolutionary adaptations that allow them to better withstand human-related effects on the environment and are more tolerant of habitat degradation. These species can spread rapidly throughout a disturbed habitat and, in doing so, alter the habitat and its associated ecosystem. Native wildlife would be drastically affected by the alteration of landscape and vegetative cover, particularly if the native vegetation that they feed on were reduced.

Long-term elevated use of Dillingham Trail resulting from the Proposed Action would lead to long-term increases in the spread of nonnative species at DMR and habitats along the proposed Dillingham Trail. There would be an increase of conventional trucks and Strykers on the roads to DMR and the proposed Dillingham trail. Seventy-four trucks and 64 Strykers would use the roads and trail during training four times each year. Sixty percent of the trucks

and ninety percent of the Strykers would use the trail, as compared to a road. This would mean the introduction of Strykers on both road and trail and an increase of 59 trucks used each event, compared to ongoing Legacy Force activities. Soil and wind erosion would increase as a result of the introduction of these larger, heavier vehicles and the increase in total vehicles needed to go to and from DMR to support the elevated training. The Proposed Action would increase the likelihood of a fire in the ROI, as detailed in Impact 2. Alien species often benefit from fires, due to their ability to colonize areas following a burn. Also, the presence of alien species often provides fuel for wildfires, makes fires larger, and facilitates the spread of fire.

Changes in vegetation can also adversely affect wildlife at sensitive times of their lifecycles by altering elements that they depend on, such as shelter. The threat of animals introduced into the areas surrounding the military vehicle trail by construction and use of the Dillingham Trail is considered low due to the relative absence of risk factors. The airport at DMR is mainly used recreationally by gliders and is not used regularly for inter-island or international transportation. This means there is a low risk that nonnative species will be brought directly to DMR from outside the state, and therefore introduction of vector species and material is not likely. The Proposed Action would not be expected to affect the populations of feral ungulates or other alien mammals. However, increased transport of troops among sub-installations and between islands could increase the likelihood of alien plants or invertebrates colonizing new areas. Alien invertebrates may be introduced into these areas as a result of construction and increased traffic, which would provide a vector for nonnative species in the area. An example of a potential invasive invertebrate is the black twig borer, which is not currently found in DMR. If this species were introduced there, it would find the host *Bobea* species, which is a commonly available host species for the borer in other locations.

In summary, increasing training at DMR, constructing the Dillingham Trail, and increasing the number of people the number of vehicles, and total usage of the trail could increase the number and type of alien plants and animals at DMR, causing an increase in the impact on sensitive species.

Regulatory and Administrative Mitigation 3. USARHAW would follow HQDA guidance developed in consultation with the Invasive Species Council and compliance with Executive Order 13112, which determines federal agency duties in regard to preventing and compensating for invasive species impacts. USARHAW would agree to all feasible and prudent measures recommended by the Invasive Species Council that would be taken in conjunction with SBCT action to minimize the risk of harm. Implementing an environmental management system would further improve the identification and reduction of environmental risks inherent in mission activities. This would reduce this impact to less than significant.

Additionally, Section 7 consultation and regulatory and administrative mitigations 1, 2, and 4 would apply to this impact and would help reduce the impact to a less than significant level.

Additional Mitigation 3. Potential mitigation measures for this impact include:

- USARHAW is considering educating soldiers and other potential users of the facilities and roads in the importance of cleaning vehicles and field gear. Contractors and their employees would be educated about the need to wear clean clothes and to maintain clean vehicles when coming onto the construction site and would comply with measures to avoid introducing alien species to the project site.
- USARHAW is considering using native plants in any new landscaping or planting efforts, where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat.
- The Army is considering requiring all construction vehicles and equipment, excluding privately owned vehicles, to undergo a mandatory wash prior to entering construction sites. The construction vehicles and equipment would be left at the construction site or would be rewashed before returning to the construction site.
- USARHAW is considering inspecting and washing all military vehicles at wash rack facilities before they leave SBMR, KTA, or PTA to minimize spreading weeds, such as fountain grass, and relocating invertebrates.

Additional Mitigations 1, 2, and 4 would apply to this impact and would help reduce the impact to the less than significant level.

Impact 4: Loss and degradation of sensitive species and habitat. The proposed training and construction activities at DMR and Dillingham Trail would be primarily direct and short-term but long-term direct and indirect effects could significantly degrade habitat and negatively affect species within the ROI.

Construction in the DMR ROI would draw more people to the area. This would have an impact on wildlife species that could be affected by noise or by visual disturbances and would increase the spread of nonnative species (see Impact 3). Trail construction would create dust that would affect the ability of plants in the immediate area to photosynthesize. Long-term increases in dust production would result from the increased use of Dillingham Trail and training activities.

The construction of Dillingham Trail would not fragment any natural vegetation communities. The trail is located in areas of agricultural use, and the vegetation that surrounds these areas is primarily non-native species with some common natives.

The jurisdictional wetland identified within the DMR ROI (Figure 6-18) would not be adversely affected by the proposed project. No construction or training has been proposed in this area.

Loss in habitat value occurs on both the land taken for the expanded trail and areas surrounding it that are affected by the increased use of the area and exposed to increased noise, car fumes, general activity, and invasive species. Dust, erosion, and runoff would continue to adversely affect the areas that surround the road.

A major cause of soil erosion and lowered habitat degradation is maneuver training, as discussed in Section 5.10.2. Off-road unrestricted mounted training would occur on approximately 507 acres (205 hectares) of the DMR ROI. The ATTAC model estimates off-road vehicle use in the DMR at 1710 MIMs and predicts it would reach 4,335 MIMs as a result of SBCT activities. Off-road mounted maneuvers proposed in portions of northern DMR (Figure 2-5) would destroy vegetation and cause severe soil erosion; however, this area is already very disturbed, so no federally or state listed plants or wildlife would be directly affected by these actions. No BSAs occur within the off-road mounted maneuverability area. BSAs could be affected by a wildfire started as a result of training.

Fire could have a large impact on the value of habitat in the DMR ROI and is discussed in Impact 1. General training and construction impacts would be significant but mitigable to a less than significant level.

Regulatory and Administrative Mitigation 4. In accordance with Section 404 of the CWA, any activities involving the discharge of dredged or fill material that may occur in this wetland must be reviewed by the Corps prior to construction to determine if a Department of the Army permit is required. If a Department of the Army permit is required, then a CWA Section 401 Water Quality Certification issued by the State of Hawai'i may also be required. The proposed project would not impact this wetland and therefore would not require review by the Corps. However, if the proposed project were to change where work may occur in the wetland, USARHAW will contact the Corps and abide by all appropriate CWA regulations and permit processes administered by the Corps and/or the State of Hawai'i.

To further avoid and minimize impacts on sensitive species and habitats, the following mitigation measures would be followed:

- Section 7 consultation and other regulatory and administrative mitigation 1, 2, and 3 would apply to this impact and would help reduce the impact to a less than significant level; and
- Regulatory and Administrative Mitigation measures identified as part of Section 6.08, Water Resources, and Section 6.09, Geology, would lessen this impact on sensitive species and habitat.

These mitigations would reduce this impact to a less than significant level.

Additional Mitigation 4. Potential mitigation measures for this impact include:

- Using native plants in any new landscaping or planting efforts, where practicable. When practicable, natural habitats would remain intact or adjacent areas would be restored as habitat;
- Fencing or flagging, where practicable, any sensitive plant communities from activities that may take place within the ROI; and
- Preserving or restoring sensitive habitat when feasible on its owned or leased lands.

- HQDA is considering investigating a new regulatory authority to work with nonprofit organizations to purchase buffer lands. Additional mitigation measures identified as part of Section 6.08, Water Resources, and Section 6.09, Geology, would lessen this impact on sensitive species and habitat. Additional mitigations 1, 2, and 3 would apply to this impact and would help reduce the impact to a less than significant level.

Less than Significant Impacts

Threat to migratory birds. The presence of the FTI antennas could significantly affect migratory bird species known to occur in the DMR ROI, especially those that migrate at night (USFWS 2000). Although the exact number of bird fatalities from tower collisions in Hawai'i is not known, birds are killed in large numbers worldwide by antenna support structures each year (USFWS 2000). This is a violation of the MBTA (16 USC 703-712), which prohibits taking or killing migratory birds. Tower size is also considered a factor, with towers taller than 200 feet (61 meters) responsible for the greatest number of bird fatalities (Manville 2000).

Migratory bird species known to occur at SBMR that could be adversely affected by the Proposed Action include the white-tailed tropicbird, black-crowned night heron, barn owl, golden plover, and northern cardinal (USARHAW and 25th ID [L] 2001a). USFWS tower guidelines (USFWS 2000), attached in Appendix I-2, would be integrated into the Proposed Action to ensure that MBTA species would not be significantly affected by the construction and placement of antennas in the SBCT ROI. Key avoidance measures include using no lighting or guy wires on the towers and keeping all towers below 199 feet.

UAVs would be allowed in restricted airspace over the entire training area, but activity is not anticipated to threaten night-migrating birds. If night collisions with birds did occur, then UAV operations would be halted at night until the USFWS and the Army could agree on a solution.

The following Army SOPs and BMPs identified for federal agencies in EO 13186 would help minimize the overall impact of SBCT actions on migratory birds:

- In accordance with the MBTA, USARHAW would avoid polluting or altering the environment and would monitor migratory birds in the proposed ROI, focusing on species of concern to ensure that migratory bird numbers do not decline because of the Proposed Action.
- Annually, USARHAW inventories, and would continue inventorying, monitoring, collecting and assessing information on natural resources in training areas. USARHAW would use ITAM LCTA and Army ecosystem management that might be considered relevant to migratory bird conservation. It would share information gathered with the USFWS, the Biological Resources Division of the USGS, and other appropriate repositories, such as the Cornell Laboratory of Ornithology.

Noise and visual impacts. Increased movement of vehicles along Dillingham Trail would lead to an increase in human noise, which could have adverse effects on wildlife by deterring them from using the land to forage, rest, or breed. General SBCT training would occur only in

areas already used for training at DMR. No new helicopter use would be added to that now used at Dillingham. There will be new use of UAV flights, but this would be over military ranges and would have minimal impact. Airfield use is ongoing and thus aircraft noise is not expected to significantly affect wildlife species at DMR.

These impacts are expected to be less than significant based on the highly developed nature of much of the proposed trail area and the limited use of the trail once it is built. Noise produced as part of proposed training activities would be mitigated by ongoing Army environmental management (Section 2.2.4). These measures would ensure that noise and visual impacts on sensitive species would be less than significant.

Less than significant impacts on marine wildlife resources in the DMR ROI are expected as a result of military aircraft noise. UAVs are unlikely to occur over water in the DMR ROI due to difficulty of deployment in the proximity of civilian aircraft. The air-water surface is an extremely effective barrier for noise. Airborne noise is transmitted to the underwater environment only when the noise source is essentially directly overhead (Richardson et al. 1995). Ambient noise levels on shorelines are already quite high naturally, and marine mammals and sea turtles have adapted to this. No aircraft are known to land on the beach or shoreline. Flights at DMR ROI would be relatively infrequent, short-lived, and unlikely to traverse the same section of coast or offshore area every time.

Less than significant impacts on marine wildlife resources in the DMR ROI are expected as a result of SBCT related military aircraft visual events because there would be no change in aircraft use at DMR except for the introduction of UAVs. The probability of significant aircraft visual impacts on marine wildlife at a population level as a result of SBCT aircraft activities in the coastal waters or shoreline of the DMR ROI is considered to be low and less than significant based on flight use patterns described above.

Impacts on general vegetation and wildlife. General SBCT training would occur on established roads or trails, as well as areas designated for maneuver training throughout the installation. Biological resources would not be expected to be affected by maneuvers on existing roads and trails. In addition, the use of the UAV would not be expected to affect biological resources during general operation. No new areas would need to be cleared for the use of the UAV.

As part of the Proposed Action, off-road training using the Stryker vehicle would occur within DMR. Wildlife in these areas would be expected to sustain minor adverse impacts as a result of off-road maneuvers. Wildlife would generally be expected to vacate areas that are being used for off-road maneuvers, but wildlife that do not vacate areas being used for maneuver could sustain injuries. The most likely species to be affected by off-road maneuvers would be ground-nesting birds or small mammals. There are no native ground-nesting birds breeding in the off-road maneuver area, or native small mammals occurring in this area, so the impact to general terrestrial wildlife is considered less than significant.

Off-road training would occur only in previously disturbed areas and would not affect native ecosystems. Approximately 98 percent of the land area at DMR is dominated by nonnative

species. The natural communities within the boundary of DMR are two types of lowland dry communities that are on the cliff slopes at the southern end of the training area. These areas would not be used for maneuver training and therefore would not be affected by the use of the Stryker vehicle.

Vegetation at DMR is not be expected to be adversely affected by the Proposed Action, except in areas that would be used for Stryker maneuver. However, the areas that would be used for Stryker maneuver are considered disturbed and are dominated by nonnative vegetation, so in these areas impacts would not be significant.

Wildlife in these areas would be expected to sustain minor adverse impacts as a result of off-road maneuvers. Wildlife would generally be expected to vacate areas that are being used for off-road maneuvers, but wildlife that do not vacate areas being used for maneuver could sustain injuries. The most likely species to be affected by off-road maneuvers would be ground-nesting birds or small mammals.

No Impacts

Runoff impacts on marine wildlife and coral ecosystems. No impacts from potential runoff are expected for marine wildlife resources or coral. No increase in run-off as a result of SBCT activities is expected. DMR is on the leeward side of the island, so storm runoff is minimal. The expected increase in erosion, described in Section 6.08, would be within the natural range due to rainfall and runoff variation, and no impacts are expected on marine wildlife. Short-term impacts from construction and use of the trail would be reduced to less than significant levels by implementing standard construction BMPs for runoff control. No in-water or beach activities are associated with SBCT and therefore no direct effects from runoff on marine wildlife or coral reefs and their associated organisms would occur.

Reduced Land Acquisition Alternative

The impacts associated with RLA would be identical to those described for the Proposed Action.

No Action Alternative

Significant but Mitigable to Less than Significant Impacts

Impact 1: Impacts from fire on sensitive species and habitat. Impacts from fire on sensitive species and sensitive habitat would continue under No Action. Several Legacy Force actions are potential sources of fires at DMR, including vehicle traffic (R.M. Towill, Corp. 1997b). There is a high risk of fire due to troop training in the DMR dry Mokulēʻia region (R.M. Towill, Corp. 1997b). The mitigations listed below are taken from the ESMPR. The Army is addressing fire control in an island-wide fire management to minimize impacts from fire by undertaking the following (R.M. Towill, Corp. 1997b):

- Reevaluating and revising DMR's current fire control plan and program for inclusion in the Oʻahu General Fire Management Plan;
- Regularly updating incident command system contact personnel and reviewing fire control protocols;

- Posting signs about the Army's regulations concerning ignition sources; and
- Improving fire education and awareness by preparing educational materials on fire hazards and preventive measures.

Impact 2. Impacts on federally listed species and their federally designated or proposed critical habitat. There have been and would continue to be impacts on the listed plants and wildlife. Vehicle and dismounted maneuvers, along with nonlive-fire training at DMR, occurs primarily on disturbed portion of the ROI that are of low value to Hawai'i's listed species. However, the effects of fire, spread of nonnative species, noise pollution and visual presence of humans in or nearby designated and sensitive habitats negatively affects listed species that use or would potentially use this area.

The Army is undergoing Section 7 Consultation for the impacts on federally listed species and their designated critical habitat from routine training at DMR. It would consult about proposed plant habitat for its designation. All reasonable and prudent measures determined during this consultation would be incorporated into the Proposed Action. Ongoing programs that would lessen the impact on listed species and their designated or proposed critical habitat include the ecosystem management plan, endangered species management plan, and INRMP (USARHAW and 25th ID[L] 2001a; R. M. Towill Corp. 1997b). These measures would help avoid effects and would compensate for impacts on listed species that would result directly and indirectly from implementing the No Action.

Impact 3. Impact on sensitive species resulting from the spread of nonnative species. The impact on sensitive species resulting from the spread of nonnative species would continue under No Action. Alien plants and animals, some of which may be invasive, have likely been introduced and would continue to be introduced into natural areas at DMR. Under the status quo of No Action, impacts on biological resources would continue at current levels. In compliance with EO 13112 on invasive species, the Army would continue to undertake all feasible and prudent measures to minimize the risk of harm caused by invasive species. Several habitat-modifying introduced plants are documented as having invaded DMR's natural areas. Species such as koa haole, guinea grass *(Panicum maximum)*, and Christmas berry *(Schinus terebinthifolius)* are particular threats. These species, along with other invasive plant species, are expected to continue to spread further as a result of Legacy Force actions. Introduced invertebrates at DMR include the invasive black twig borer, which is known to infest plant species. Provisions are made for reducing these impacts in the O'ahu Training Areas INRMP (USARHAW and 25th ID[L] 2001a) by surveying for nonnatives, fencing out invasive mammals, increasing weed eradication, and removing nonnative invertebrates. These impacts are minimized by limiting training areas, keeping inventories of species of concern with the potential to occur at SBMR, and promoting conservation by educating the military and the general public, all of which are included in ongoing Army environmental management (Section 2.2.4)

Impact 4: Loss and degradation of sensitive and general habitat. Loss and degradation of sensitive and general habitat would continue under No Action. Troop and other foot traffic in or adjacent to native forest areas could continue to harm rare natural communities, plants, and snails (R.

M. Towill, Corp. 1997b). Mitigation for these impacts in the ESMPR would continue to include implementing guidelines for use of training areas within DMR. The goal of the training impact management would be to limit trampling and overall loss of habitat range (R. M. Towill Corp. 1997b). These impacts are minimized by limiting training areas, keeping inventories of species of concern with the potential to occur at SBMR, and promoting conservation by educating the military and the general public, all of which are included in ongoing Army environmental management (Section 2.2.4)

Less than Significant Impacts

Threat to migratory birds. Legacy Force activities would continue to have a less than significant impact on migratory birds. Status quo activities in the ROI may incidentally affect migratory birds but are unlikely to severely disturb birds, considering the highly disturbed nature of the present training area.

Noise and visual impacts. Noise would continue to be produced as a result of Legacy Force activities. Noise would have an adverse impact on animals in the area due to disturbance but would not significantly affect their behavior and would not lead to a population level decline. Studies such as the *Final Report: A Study to Determine the Effects of Noise from Military Training on the Endangered O'ahu 'Elepaio* (HINHP 1998) show that Army-related noise on O'ahu has not significantly affected species, including sensitive species, such as the 'elepaio. There are no visual impacts under this alternative.

Impacts on general vegetation and wildlife. Troop and other foot traffic in or adjacent to native forests could continue to harm rare natural communities, plants, and snails (R. M. Towill Corp. 1997b). Mitigations for these impacts in the ESMPR include implementing guidelines for use of training areas within SBMR. The goal of the training impact management would be to limit trampling and overall loss of habitat range (R. M. Towill Corp. 1997b).

No Impacts

Runoff impacts on marine wildlife and coral ecosystems. SBCT activities at DMR are not expected to result in runoff impacts on marine wildlife and coral ecosystems due to limited activities that would occur there. This determination may change on evaluation of water sampling now occurring at MMR.